National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 6420h (DSI-6420h)

NOAA Research Flight Data (AOC)

G-IV (NOAA-49) HURRICANE SEASON 2005

May 3, 2006

National Climatic Data Center
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Asheville, NC 28801-5001 USA

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1. Abstract

NOAA's Aircraft Operations Center (AOC) maintains and operates a Gulfstream-IV jet aircraft for weather research projects throughout the year. Examples of these projects include hurricane surveillance, winter storm operations, and ozone and atmospheric chemistry missions. Each of these projects consists of a series of individual flights.

The real-time flight-level data is collected and written to the hard drive (.ADS file) as well as to a digital audio tape (DAT) on the aircraft. Afterwards, the file or tape is read and processed into a NetCDF format by a software program called NIMBUS created by Chris Webster of UCAR. For each archived project sent to NCDC, there are multiple directories consisting of individual flights. The data in these flight directories contain real-time measurements obtained from sensors located throughout the aircraft. Included in a flight directory are the raw ADS data file and the one hertz NetCDF file.

Due to the complexity of the ADS file, the following documentation is designed to describe the contents of the simpler and more commonly used NetCDF file.

2. Element Names and Definitions

NOAA-49 Aircraft N49RF Hurricane Season 2005

The NetCDF file contains the following measured and derived parameters along with the corresponding definitions.

ACINS	Aircraft Vertical Acceleration from Inertial One- M/(S^2)
ACINS_PITR	Aircraft Vertical Acceleration from Inertial Two M/(S^2)
ADCAOA	Air Data Computer Attack Angle from Flight Station (Degree)
ADCBCALT	Air Data Computer Baro Corrected Altitude (Meter)
ADCCAS	Air Data Computer Computed Airspeed (M/S)
ADCMACH	Air Data Computer Mach Number (None)
ADCPALT	Air Data Computer Pressure Altitude (Mbar)
ADCSAT	Air Data Computer Static Air Temperature (Celsius)
ADCTAS	Air Data Computer True Airspeed (M/S)
ADCTAT	Air Data Computer Total Air Temperature (Celsius)
AKRD1	Attack Angle, Left Side (Degree)
AKRD2	Attack Angle, Right Side (Degree)
ALT	IRS Baro-Inertial Altitude from Inertial One (Meter)
ALT_PITR	IRS Baro-Inertial Altitude from Inertial Two (Meter)
AOCDA	Computed Drift Angle from Inertial One (Degree)
AOCDA_PITR	Computed Drift Angle from Inertial Two (Degree)
AOCTK	Computed Track Angle from Inertial One (Degree)
AOCTK_PITR	Computed Track Angle from Inertial Two (Degree)
AP1	Vertical Differential Pressure, Left (mbar)
AP2	Vertical Differential Pressure, Right (mbar)
AT1	Ambient Temperature, Top Left (Celsius)
AT2	Ambient Temperature, Bottom Right (Celsius)
AT3	Ambient Temperature, Top Right (Celsius)
AT4	Ambient Temperature, Bottom Left (Celsius)
ATTACK	Attack Angle, Reference (Degree)
ATX	Ambient Temperature, Reference (Celsius)

BCRYO	No Title
BP1	Horizontal Differential Pressure, Top (Mbar)
BP2	Horizontal Differential Pressure, Bottom (Mbar)
CRYO	CR-2 Hygrometer (Celsius)
CRYOC	CR-2 Hygrometer, Corrected (Celsius)
DAP1	Raw Dynamic Attack Pressure, Left (Mbar)
DAP2	Raw Dynamic Attack Pressure, Right (Mbar)
DAY	Raw Tape Day Component (none)
DBP1	Raw Dynamic Slip Pressure, Top (Mbar)
DBP2	Raw Dynamic Slip Pressure, Bottom (Mbar)
DIFF1	Difference Utility 1 (none)
DIFF2	Difference Utility 2 (none)
DIFF3	Difference Utility 3 (none)
DPL	Dew/Frost Point Temperature, Left (Celsius)
DPLC	Corrected Dew/Frost Point Temperature, Left (Celsius)
DPR	Dew/Frost Point Temperature, Right (Celsius)
DPRC	Corrected Dew/Frost Point Temperature, Right (Celsius)
DPX	Dew/Frost Point Temperature, Reference- Either Right or Left (Celsius)
DPXC	Corrected Dew/Frost Point Temp, Reference- Either Right or Left (Celsius)
DRFTA	Inertial Drift Angle from Inertial One (Degree)
DRFTA_PITR	Inertial Drift Angle from Inertial Two (Degree)
DVALU	D-Value (HGME-PALT) (Meter)
EDPC	Ambient Water Vapor Pressure, Reference (Mbar)
EVENT_CKP	Event Marker (none)
EVENT_CTL	Event Marker (none)
EVENT_FCL	Event Marker (none)
EVENT_FCR	Event Marker (none)
EVENT_RCL	Event Marker (none)
EVENT_RCR	Event Marker (none)
GDIF1	Collins GPS- IRS#1 Position Difference (Meter)
GDIF2	Collins GPS- IRS#2 Position Difference (Meter)
GHALT-SG1	Honeywell GPS Altitude #1 –MSL (Meter)
GHALT_SG2	Honeywell GPS Altitude #2 –MSL (Meter)
GHGSF_SG1	Honeywell GPS Ground Speed #1 (M/S)
GHGSF_SG2	Honeywell GPS Ground Speed #2 (M/S)
GHHDOP_SG1	Honeywell GPS Horizontal Dilution of Position #1 (none)
GHHDOP_SG2	Honeywell GPS Horizontal Dilution of Position #2 (none)
GHHFOM_SG1	Honeywell GPS Horizontal Figure of Merit
GHHFOM_SG2	Honeywell GPS Horizontal Figure of Merit (Meter)
GHLATF_SG1	Honeywell GPS Latitude #1, Fine (Degree)
GHLATF_SG2	Honeywell GPS Latitude #2, Fine (Degree)
GHLAT_SG1	Honeywell GPS Latitude #1 (Degree)
GHLAT_SG2	Honeywell GPS Latitude #2 (Degree)
GHLONF_SG1	Honeywell GPS Longitude #1, Fine (Degree)
GHLONF_SG2	Honeywell GPS Longitude #2, Fine (Degree)
GHLON_SG1	Honeywell GPS Longitude #1 (Degree)
GHLON_SG2	Honeywell GPS Longitude #2 (Degree)
GHMSTT_SG1	Honeywell GPS Measurement Status #1 (none)
GHMSTT_SG2	Honeywell GPS Measurement Status #2 (none)
GHSTAT_SG1	Honeywell GPS Status #1 (none)
GHSTAT_SG2	Honeywell GPS Status #2 (none)
GHUTC_SG1	Honeywell Time #1 (Seconds)
GHUTC_SG2	Honeywell Time #2 (Seconds)
GHVDOP_SG1	Honeywell GPS Vertical Dilution of Position #1 (none)
GHVDOP_SG2	Honeywell GPS Vertical Dilution of Position #2 (none)
GHVEW_SG1	Honeywell GPS Ground Speed Vector, East Component #1 (M/S)

GHVEW_SG2	Honeywell GPS Ground Speed Vector, East Component #2 (M/S)
GHVFOM_SG1	Honeywell GPS Vertical Figure of Merit #1 (Meter)
GHVFOM_SG2	Honeywell GPS Vertical Figure of Merit #2 (Meter)
GHVNS_SG1	Honeywell GPS Ground Speed Vector, North Component #1 (M/S)
GHVNS_SG2	Honeywell GPS Ground Speed Vector, North Component #2 (M/S)
GHVZI_SG1	Honeywell GPS Computed Aircraft Vertical Velocity #1 (M/S)
GHVZI_SG2	Honeywell GPS Computed Aircraft Vertical Velocity #2 (M/S)
GPALT	Collins GPS Altitude MSL- (M)
GPGALT	Collins GPS Geopotential Altitude (M)
GPGSPD	Collins GPS Ground Speed (M/S)
GPLAT	Collins GPS Latitude (Degree)
GPLON	Collins GPS Longitude (Degree)
GPTIME	Collins GPS Time (Seconds)
GPTTP	Honeywell GPS Time to Waypoint (Seconds)
GPVEW	Collins GPS Ground Speed Vector, East Component (M/S)
GPVNS	Collins GPS Ground Speed Vector, North Component (M/S)
GPVSPD	Collins GPS Computed Aircraft Vertical Velocity (M/S)
GSF	Inertial Ground Speed from Inertial One (M/S)
GSF_PITR	Inertial Ground Speed from Inertial Two (M/S)
HGALT	APN-232 Radar Geopotential Altitude (Meter)
HGM232	Geometric (Radar) Altitude APN-232- (Meter)
HGM232S	APN-232 Radar Altitude Status Bit (Meter)
HOUR	Raw Tape Time Component (Second)
IAS	Aircraft Indicated Airspeed (M/S)
IWD	Horizontal Wind Direction (IRS) Inertial One (Degree)
IWD_PITR	Horizontal Wind Direction (IRS) Inertial Two (Degree)
IWS	Horizontal Wind Speed (IRS) Inertial One (M/S)
IWS_PITR	Horizontal Wind Speed (IRS) Inertial Two (M/S)
LAT	Latitude from Inertial One (Degree)
LAT_PITR	Latitude from Inertial Two (Degree)
LON	Longitude from Inertial One (Degree)
LON_PITR	Longitude from Inertial Two (Degree)
MACH	Aircraft Mach Number (none)
MINUTE	Raw Tape Time Component (Second)
MONTH	Raw Tape Month Component (none)
MR	Mixing Ratio, T-Electric (G/Kg)
ONE	Constant Value of One (none)
PALT	NACA Pressure Altitude in Meters (Meter)
PALTF	NACA Pressure Altitude in Feet (Feet)
PCAB	Cabin Pressure (Mbar)
PCRYO	CR-2 Hygrometer Pressure (Mbar)
PITCH	Aircraft Pitch Angle from Inertial One (Degree)
PITCH_PITR	Aircraft Pitch Angle from Inertial Two (Degree)
PS1C	Corrected Static Pressure, Top Fuselage (Mbar)
PS1M	Raw Static Pressure, Top Fuselage (Mbar)
PS2C	Corrected Static Pressure, Bottom Fuselage (Mbar)
PS2M	Raw Static Pressure, Bottom Fuselage (Mbar)
PSX	Raw Static Pressure, Reference (Mbar)
PSXC	Corrected Static Pressure, Reference (Mbar)
QC1C	Corrected Dynamic Pressure, Left (Mbar)
QC1M	Raw Dynamic Pressure, Left (Mbar)
QC2C	Corrected Dynamic Pressure, Right (Mbar)
QC2M	Raw Dynamic Pressure, Right (Mbar)
QCX	Raw Dynamic Pressure, Reference (Mbar)
QCXC	Corrected Dynamic Pressure, Reference (Mbar)
RHODL	Absolute Humidity, T-Electric Left (g/(m^3))

RHODR	Absolute Humidity, T-Electric Right (g/(m^3))
RHUM	Relative Humidity (%)
ROLL	Aircraft Roll Angle from Inertial One (Degree)
ROLL_PITR	Aircraft Roll Angle from Inertial Two (Degree)
SECOND	Raw Tape Time Component (Second)
SSDF1	Sideslip Angle, Differential Pressure, Top (Mbar)
SSDF2	Sideslip Angle, Differential Pressure, Bottom (Mbar)
SSLIP	Sideslip Angle, Reference (Mbar)
SSRD1	Sideslip Angle, Top (Mbar)
SSRD2	Sideslip Angle, Bottom (Mbar)
TAS1	Aircraft True Airspeed #1 (M/S)
TAS2	Aircraft True Airspeed #2 (M/S)
TASHC	Aircraft True Airspeed, Humidity Corrected (M/S)
TASX	Aircraft True Airspeed, Reference (M/S)
THDG	Aircraft True Heading Angle From Inertial One (Degree)
THDG_PITR	Aircraft True Heading Angle From Inertial Two (Degree)
THETA	Potential Temperature (Degree)
THETAE	Equivalent Potential Temperature (Celsius)
THETAV	Virtual Potential Temperature (Celsius)
TKAR	Aircraft Track Angle Rate from Inertial One (Degree/Second)
TKAR_PITR	Aircraft Track Angle Rate from Inertial Two (Degree/Second)
TKAT	Aircraft Track Angle from Inertial One (Degree)
TKAT_PITR	Aircraft Track Angle from Inertial Two (Degree)
TT1	Total Temperature, Left Top (Celsius)
TT2	Total Temperature, Right Bottom (Celsius)
TT3	Total Temperature, Left Bottom (Celsius)
TT4	Total Temperature, Right Top (Celsius)
TTX	Total Temperature, Reference (Celsius)
UI	Wind Vector, East Component (M/S)
UX	Wind Vector, Longitudinal Component (M/S)
VEW	Inertial Ground Speed Vector, East Component from Inertial One (M/S)
VEW_PITR	Inertial Ground Speed Vector, East Component from Inertial Two (M/S)
VI	Wind Vector, North Component (M/S)
VNS	Inertial Ground Speed Vector, North Component from Inertial One (M/S)
VNS_PITR	Inertial Ground Speed Vector, North Component from Inertial Two (M/S)
VSPD	IRS-Computed Vertical Velocity from Inertial One (M/S)
VSPD_PITR	IRS-Computed Vertical Velocity from Inertial Two (M/S)
VY	Wind Vector, Lateral Component (M/S)
WD	Horizontal Wind Direction (Degree)
WI	Wind Vector, Vertical Gust Component (M/S)
WP3	Damped Aircraft Vertical Velocity from Inertial One (M/S)
WP3_PITR	Damped Aircraft Vertical Velocity from Inertial Two (M/S)
WS	Horizontal Wind Speed (M/S)
XLATC	GPS-Corrected Inertial Latitude (Degree)
XLONC	GPS-Corrected Inertial Longitude (Degree)
XMACH2	Aircraft Mach Number Squared (none)
XVEWC	GPS-Corrected Inertial Ground Speed Vector, East Component (M/S)
XVNSC	GPS-Corrected Inertial Ground Speed Vector, North Component (M/S)
YEAR	Raw Tape Year Component (none)
ZERO	Constant Value of Zero (none)

3. Start Date

20050501

4. Stop Date

20051201

5. Coverage

a. Southernmost Latitude: 10 N (or S)
b. Northernmost Latitude: 35 N (or S)
c. Westernmost Longitude: -100 W (or E)
d. Easternmost Longitude: -40 W (or E)

6. How to Order Data

Ask NCDC's Climate Services about costs of obtaining this dataset.
Phone 828-271-4800
Fax 828-271-4876
e-mail- orders@ncdc.noaa.gov

7. Archiving Data Centers

Name : National Climatic Data Center/NCDC
Address: Federal Building
151 Patton Ave.
Asheville, NC 28801-5001
Voice Telephone: 828-271-4800

Name: Aircraft Operations Center
Address: Science and Engineering Division
P.O. Box 6829
MacDill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

8. Technical Contact

Flight Director's Name: Martin Mayeaux, Paul Flaherty, Barry Damiano, Jack Parrish
Address: Aircraft Operations Center
P.O. Box 6828
MacDill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

NIMBUS Software to read ADS File
http://www.atd.ucar.edu/atd/instruments/raf/ads
Chris Webster
cjw@ucar.edu

9. Known Uncorrected Problems

none

10. Quality Statement

Note: The parameters listed as "Reference", in the elements and definitions section, represent the best sensor chosen amongst the group of sensors

measuring an atmospheric phenomenon. The sensor that is used as the reference value may also be used as input for other parameter derivations.

11. References

none